Autonomous Monitoring and Control of Rocket Test Systems

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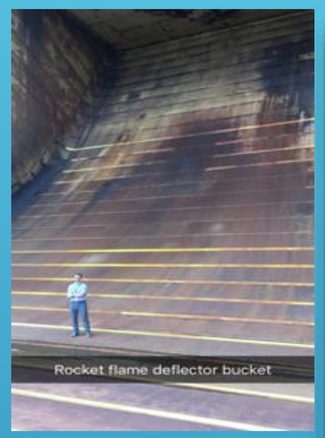
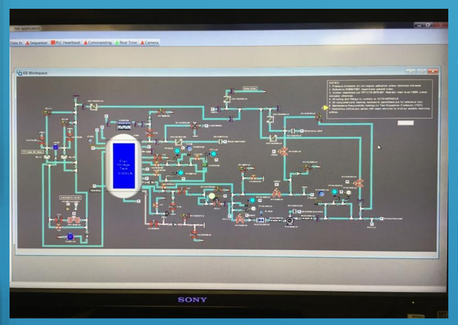
Introduction

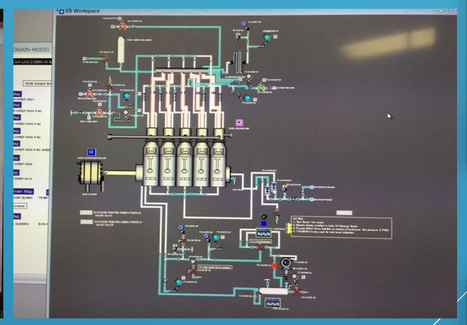
I am currently an undergraduate student pursuing a degree in Electrical and Computer Engineering. Working alongside me is Addison Howenstine who is currently an undergraduate student at Duke University.

Our mentor is Fernando Figueroa.

The main goal of our project is to aid with the refining and development of the new Intelligent Health Monitoring System for the liquid nitrogen system. Once the Health Monitoring System is completed, it will replace the old control system in the High Pressure Gas Facility (HPGF).







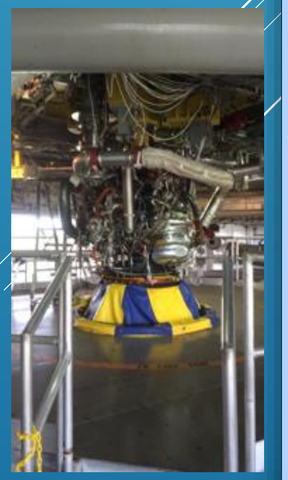
Objectives

Learn how to use the NASA-developed Autonomous Operations Mission Development Suite (AO-MDS) which will be used as a platform for Intelligent Health Management of the nitrogen system at the High Pressure Gas Facility

Introduce ourselves to and learn the language of the Intelligent Applications software platform Gensym2 (G2) in order to contribute to and aid with the refinement and development of the control system.

Complete debugging and development of the software code of the liquid nitrogen control system. Ensure proper function and ease of maintenance once it is implemented at the High Pressure Gas Facility.

Begin the development of a Symcure Model-based Diagnosis Map that will help the operators troubleshoot and resolve problems within the system.



Outcomes

We will have accumulated experience and gained a better understanding of:

- The Intelligent Applications software platform G2
- Coordinating and working with a professional engineering and software development team.
- Basic knowledge of rockets and rocket engines
- Ladder Logic
- Programmable Logic Controllers (PLC)
- Cryogenic liquids
- Intelligent monitoring and control systems
- High Pressure Gas Systems
- Electrical and mechanical schematic drawings
- Team development strategies
- The Model-based Diagnosis program of Symcure

Summary

Once the new Intelligent Applications software platform is implemented at the High Pressure Gas Facility, operators will be able to detect a wider range of various anomalies and provide a faster diagnosis more effectively.

This system will be a great improvement to SSC since it will reduce costs, enhance quality of data, and optimize safety.

As interns we gained crucial experience of working in a professional engineering environment, while contributing to the development of the new Intelligent Health Monitoring system that will be implemented in the High Pressure Gas Facility in the near future.

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